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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/810,081

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EXAMINER

BEST, ZACHARY P

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/810,081	Applicant(s) WEST ET AL.	
	Examiner Zachary Best	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 38-49 and 51-90 is/are pending in the application.
- 4a) Of the above claim(s) 38-48 and 55-65 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 49, 51-54 and 66-90 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

ELECTROLYTE INCLUDING POLYSILOXANE
WITH CYCLIC CARBONATE GROUPS

Examiner: Z. Best S.N. 10/810,081 Art Unit: 1795

DETAILED ACTION

1. Applicant's amendment and request for reconsideration filed on March 23, 2009 was received. Claims 1 and 49 were amended. Claims 1-7, 49, 51-54, and 66-90 are currently pending examination.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-7, 49, 51-54, and 66-90 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claim limitation "the first side chain and the

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second side chain each terminating before linking the first backbone to a second backbone of a second polysiloxane” is not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

5. Claims 1-6, 49, 51-52, 66-69, 71-74, 76, 78, 81-84, 86, and 88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spiegel et al. (US 6,447,952 B1) in view of Kang et al. (6,783,897 B2).

Regarding Claims 1, 49, 71, 76, 81, and 86, Spiegel et al. teach a battery (electrochemical device, abstract) comprising a polymer electrolyte that is elastomeric (solid) including a polysiloxane having one or more backbone silicons linked to a first side chain and one or more backbone silicons linked to a second side chain (formulas I and II, col. 3, lines 32-44), wherein one of aforesaid chains (second side chain) comprises a cyclic carbonate group (col. 4, lines 12-18). However, Spiegel et al. fail to teach the other aforesaid chain (first side chain) comprises a polyalkylene oxide group.

Kang et al. teach an electrolyte having a polysiloxane polymer as the backbone (abstract), wherein the backbone is crosslinked with polyalkylene oxide groups (col. 3, lines 3-22) because the polyalkylene oxide group provides an further increase the compatibility with a plasticizer and improve ionic conductivity (col. 4, lines 31-46). Therefore, it would have been obvious to one having ordinary skill in the art to crosslink the electrolyte comprising polysiloxane backbone of Spiegel et al. with polyalkylene oxide groups because

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Kang et al. teach a polysiloxane crosslinked with polyalkylene oxide groups provides a further increase the compatibility with a plasticizer and improve ionic conductivity.

Regarding Claim 2, Spiegel et al. teach each of the non-terminal silicons in the backbone of the polysiloxane are crosslinked (formulas I and II, col. 3, lines 32-44).

Regarding Claims 3 and 66, Spiegel et al. teach the polysiloxane excludes Si-H groups (col. 4, lines 4-9).

Regarding Claims 4, 67, 72, and 82, Spiegel et al. teach a spacer between the cyclic carbonate group and the backbone comprising CH₂ groups (col. 3, lines 46-59), and Kang et al. teach a spacer between the polyalkylene oxide groups comprising CH₂ groups (cols. 7-8, lines 22-62).

Regarding Claims 5, 51, 68, 73, and 83, Spiegel et al. teach the polysiloxane having a structure according to the general formulas (claims 3, 6, 23-24, and 28).

Regarding Claims 6, 52, 69, 74, and 84, Spiegel et al. teach the average molecular weight for the polysiloxane is 400-5000 (col. 5, lines 6-11).

Regarding Claims 78 and 88, Spiegel et al. teaches that the polymer electrolyte contains modification agents (col. 2, line 62 - col. 3, line 13), and Kang et al. teach a network polymer (plasticizer) interacts with the polysiloxane so as to form an interpenetrating network (col. 8, lines 4-64).

6. Claims 7, 53, 70, 75 and 85 rejected under 35 U.S.C. 103(a) as being unpatentable over Spiegel et al. in view of Kang et al. as applied to Claims 1-6, 49, 51-52, 66-69, 71-74, 76, 78, 81-84, 86, and 88 above, and further in view of Hosoya (US 2001/0036579 A1).

Spiegel et al. in view of Kang et al. teach the electrolyte as recited in paragraph 5. However, Spiegel et al. in view of Kang et al. fail to teach the ratio between the molar concentration of the active oxygens in the electrolyte and the molar concentration of lithium ions in the electrolyte is 5-50.

Hosoya teach a lithium-ion battery comprising lithium ions in an electrolyte (par. 45), wherein the active oxygen should remain as small in concentration as possible because otherwise the active oxygen will begin to decompose the electrolyte (pars. 9-11). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the electrolyte of Spiegel et al. in view of Kang et al. wherein the active oxygen concentration was kept as low as possible because Hosoya teach resultant electrolyte decomposition in a lithium ion battery when the active oxygen concentration increases. Discovery of an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272 (CCPA 1980).

7. Claims 54, 77, and 87 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spiegel et al. in view of Kang et al. as applied to Claims 1-6, 49, 51-52, 66-69, 71-74, 76, 78, 81-84, 86, and 88 above, and further in view of Carlson et al. (US 2002/0092155 A1).

Spiegel et al. in view of Kang et al. teach the electrolyte as recited in paragraph 5. However, Spiegel et al. in view of Kang et al. fail to teach the solid polymer includes one or more components selected from the group consisting of polyacrylonitrile, polymethyl methacrylate, polyvinylidene fluoride, polyvinylidene fluoride-co-hexafluoropropylene, polystyrene, polyvinyl chloride, polyalkyl methacrylate, polyalkyl acrylate, styrene butadiene rubber, polyvinyl acetate, and polyethylene oxide.

Regarding Claims 54, 77, and 87, Carlson et al. teach an lithium electrochemical cell (par. 76) comprising an electrolyte, which may be a gel or solid, comprising polysiloxane (pars. 72-73), wherein said electrolyte may be a blend of polysiloxane and polyacrylonitrile (pars. 72-73). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the electrolyte of Spiegel et al. in view of Kang et al. wherein the electrolyte is a gel or a solid polymer blend of polysiloxane and polyacrylonitrile because Carlson et al. teach functional equivalency of a gel or solid polymer electrolyte comprising polysiloxane and functional equivalency of a polysiloxane polymer electrolyte and a polysiloxane-polyacrylonitrile polymer electrolyte blend.

8. Claims 79, 80, 89, and 90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spiegel et al. in view of Kang et al. as applied to Claims 1-6, 49, 51-52, 66-69, 71-74, 76, 78, 81-84, 86, and 88 above, and further in view of Lee (US 6,680,147 B2).

Spiegel et al. in view of Kang et al. teach the electrolyte as recited in paragraph 5. However, Spiegel et al. in view of Kang et al. fail to teach said network polymer includes a polymethacrylate or polyacrylate.

Lee teaches a lithium battery comprising a polysiloxane electrolyte (abstract), wherein the polysiloxane is combined with a dimethacrylate polymer (network polymer) (col. 8, lines 63-67). It would be advantageous to use the dimethacrylate polymer as a network polymer in the electrolyte because the polymeric electrolyte composition can effectively suppress swelling of the battery due to electrolytic solution (col. 2, lines 30-33). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the electrolyte of Spiegel et al. in view of Kang et al., wherein the network polymer is a dimethacrylate polymer because Lee teaches the electrolyte can effectively suppress swelling of the battery due to electrolytic solution.

Response to Arguments

9. Applicant's arguments filed March 23, 2009 have been fully considered but they are not persuasive.

Applicant argues:

(a) The final product between Kang and Spiegel would comprise Kang's polysiloxane backbone and Spiegel's polysiloxane backbone;

(b) Lersb is non-analogous art.

In response to Applicant's arguments:

(a) Applicant appears to believe that a person skilled in the art would bring Kang's acryl group at the ends of the backbone over in combination with the backbone of Spiegel. Examiner notes two separate, specific teachings contained in Kang's discussion of the polysiloxane backbone: (1) polyalkylene oxide groups are introduced as branch groups in order to increase the compatibility with a plasticizer in order to improve ionic conductivity, and (2) the presence of 2-4 acryl functional groups at both ends of the backbone so as to give a three-dimensional network structure. Kang does not teach that teachings (1) and (2) are reliant on one another, and, in fact, Kang quite specifically notes the polyalkylene oxide branch groups as having a separate benefit. Therefore, it is reasoned that one skilled in the art would know to bring the branch groups from teaching (1) without necessarily the end groups from teaching (2) depending on desired features. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.... Rather, the test is what the combined teachings of those references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981).

(b) Examiner notes the grammatical error in the Office Action dated December 23, 2008, where Lersch et al. was cited in paragraph 8 instead of Spiegel et al. This has been corrected in paragraph 8 above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachary Best whose telephone number is (571) 270-3963. The examiner can normally be reached on Monday to Thursday, 7:30 - 5:00 (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Zpb

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795